

Optimisation of Dilute Sulphuric Acid Hydrolysis of Waste Newspaper for High Yields of Fermentable Sugars

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Abstract

Dilute sulphuric acid hydrolysis of waste paper was investigated in this study. The effects of acid concentration, time, temperature and liquid to solid ratio on the total reducing sugar concentration were studied over three levels using a four variable Box-Behnken design (BBD). A statistical model was developed for the optimisation of the process variables using response surface methodology (RSM). The optimal hydrolysis conditions that resulted in the maximum total reducing sugar concentration were: acid concentration, 1.49 %w/w; temperature, 200 °C; time, 20 min and liquid to solid ratio, 30 mL/g. Under these conditions, the total reducing sugar concentration was obtained to be 20 g/L. Validation of the model revealed no difference between predicted and experimental results.

Keywords: Bioethanol, Waste paper, Response Surface Methodology, Pretreatment, Biomass

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